UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/535,241	03/27/2000	Munetaka Tsuda	9202-0009	2675

20583 7590 04/24/2002

PENNIE AND EDMONDS
1155 AVENUE OF THE AMERICAS
NEW YORK, NY 100362711

EXAMINER	
FETZNER, TIFFANY A	

ART UNIT	PAPER NUMBER
2862	

DATE MAILED: 04/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/535,241	Tsuda, Munetaka
Examiner	**Art Unit**
Tiffany A. Fetzner	2862

-- The MAILING DATE of this communication appears on the cover sheet with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on Mar 4, 2002

2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-13 is/are pending in the applica

4a) Of the above, claim(s) _____ is/are withdrawn from considera

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-13 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirem

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☒ Some* c) ☐ None of:

1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)

16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____

18) ☐ Interview Summary (PTO-413) Paper No(s). _____

19) ☐ Notice of Informal Patent Application (PTO-152)

20) ☐ Other:

DETAILED Non-final ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file. However, applicant has not submitted certified English translations of the priority documents, therefore applicant's effective priority date as of the date of this action, is applicant's filing date of March 27th 2000. Applicant cannot rely upon the foreign priority papers to overcome the rejections set forth in this office action because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Claim Rejections - 35 USC § 102

2. The rejection of **Claims 1-13** under **35 U.S.C. 102(b)** as anticipated by **Ishihara et al.**, US patent 5,378,987 issued January third 1995; filed March 11th 1993; are **rescinded** in view of applicant's arguments in the March 4th 2002 response. However new art which addresses applicant's arguments is provided.

3. The following is a quotation of the appropriate paragraphs of **35 U.S.C. 102** that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

4. **Claims 1-13** are rejected under **35 U.S.C. 102(e)** as anticipated by **Watkins et al.**, US patent 6,252,405 B1 issued June 26th 2001 filed November 15th 1999. Applicant cannot rely

upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

5. With respect to **Claim 1**, **Watkins et al.**, teaches and shows a magnetic resonance imaging apparatus comprising: a static magnetic field generating unit (i.e. a magnet assembly) that generates a static magnetic field of a constant magnetic field intensity;" (i.e. component 168 in Figure 2 is "a static magnetic field of a constant magnetic field intensity;" [See Figure 1 main polarizing magnet 140, Figure 2 magnetic field 168, col. 3 lines 33-35, col. 4 lines 19-51] "a gradient magnetic field generating unit" (i.e. gradient assembly 139) "that generates a magnetic field strength gradient;" [See Figure 1 gradient coil system 127, gradient assembly 139 col. 3 lines 24-35, col.4 lines 17-18] "a high-frequency magnetic field generating unit; [See col. 3 lines 36-63, Figure 1] **Watkins et al.**, teaches, suggests and shows "a detecting unit" (i.e. transceiver module 150) "that detects magnetic resonance signals generated from an object to be examined"[See Figure 1, col. 3 lines 36-62].

6. **Watkins et al.**, teaches, suggests and shows"a display unit that displays a result of the detection, [See Figure 1 component 104, col. 3 lines 1-6] "wherein the magnetic resonance imaging apparatus further comprises: a magnetic field correcting unit" (i.e. correction coils 166) "that generates an additional magnetic field for making uniform a space distribution of the static magnetic field;" [See Figures 1 through 4, col. 4 line 44 through col. 6 line 51] "a temperature detecting unit that detects a temperature of the static magnetic field generating unit and/or surroundings thereof;" [See Figure 4, col. 5 line 18 through col. 6 line 51] Additionally, **Watkins et al.**, teaches and shows "a control unit" (i.e. temperature compensation system 180) "that

controls the magnetic field correcting unit;" (i.e. the correction coils 166) "based on the temperature detected by the temperature-detecting unit." [See Figures 1 through 4, col. 4 line 44 through col. 6 line 51, and the entire reference in general.]

7. With respect to **Claim 2, Watkins et al.**, teaches and suggests "the control unit has a temperature setting unit that sets a temperature detected by the temperature-detecting unit." [See col 4 lines 1-18, col. 5 line 18 through col. 6 line 51, Figures 1 through 4.] The same reasons for rejection, that apply to **claim 1** also apply to **claim 2**.

8. With respect to **Claim 3, Watkins et al.**, teaches and suggests that "the temperature detecting unit detects temperatures of at least two positions." [See col 4 lines 1-18, col. 5 line 18 through col. 6 line 51, Figures 1 through 4.] The same reasons for rejection, that apply to **claim 1** also apply to **claim 3**.

9. With respect to **Claim 4, Watkins et al.**, suggests that "the magnetic field correcting unit (i.e, correction coils 166; Figures 2, 3, and 4) "comprise a shim coil for generating an additional magnetic field" because by definition in the MRI art, a shim coil, is a magnetic field correction " "and a shim" (i.e. correction) "power source that supplies a current to the shim coil." (i.e. the correction coil driver) [See col. 4 line 1 through col. 6 line 51 in general] The same reasons for rejection, that apply to **claim 1** also apply to **claim 4**.

10. With respect to **Claim 5, Watkins et al.**, lacks directly teaching that "the control unit" (i.e of temperature compensation system 180) "comprises a voltage generating unit that generates a voltage corresponding to an ununiformity component of the magnetic field at the temperature detected by the temperature detecting unit, a voltage/current converter that converts the voltage

output by the voltage generating unit to current, and a supplying unit that supplies to the magnetic field correcting unit the current generated from the voltage/current converter." However, Figures 1 through 4 of **Watkins et al.**, and col.4 line 1 through col. 6 line 51 suggest that the correction coils, which the examiner is interpreting as "shim coils" and the correction coil power source, (i.e. the correction coil drivers) control the current and magnetic flux to maintain the Bo field at a constant value. Because the purpose of correction coils 166 is to adjust the homogeneity of the static magnetic field, it is considered inherent that the correction coil power source, (i.e. the correction coil driver(s) comprise a voltage generating unit, and that the inherent voltage generating unit of the correction coil driver(s) "generates a voltage corresponding to an ununiformity component of the magnetic field". [See col. 1 line 6 through col. 6 line 51, Figures 1 through 4, and the entire reference in general.]

11. The relationship of temperature, temperature change and temperature distribution to the static magnetic field homogeneity is also taught by **Watkins et al.**, [See col. 2 lines 36-52, col. 5 line 18 through col. 6 line 14, Figures 1 and 4] therefore, "an ununiformity component of the magnetic field at the temperature detected by the temperature detecting unit" is also suggested by the **Watkins et al.**, reference. Additionally, **Watkins et al.**, teaches that the temperature change influences the inhomogeneity of the static magnetic field, [See col. 5 line 18 through col. 6 line 14, col. 4 lines 1-18, col. 2 lines 36-52,] and that correction coils 166 adjust the homogeneity of the static magnetic field. [See col. 4 line 1 through col. 6 line 51] The correction coil drivers, taught throughout the **Watkins et al.**, reference are broadly interpreted by the examiner as comprising "a voltage/current converter that converts the voltage output by the" inherent "voltage generating

unit to current, and a supplying unit that supplies to the magnetic field correcting unit current generated from the voltage/current converter." (i.e. the correction coils 166, and all the associated components shown in Figures 2 through 4 are suggestive of this limitation. See also the entire reference in general and Figure 1.] The same reasons for rejection, that apply to **claim 1** also apply to **claim 5**.

12. With respect to **Claim 7**, **Watkins et al.**, shows and suggests that "the temperature detecting unit is disposed near the static magnetic field generating unit and/or in a room where the static magnetic field generating unit is placed." [See Figures 1 through 4, which suggests that all of the components are in close proximity to one another, or in a single defined area, (i.e. a room).] The same reasons for rejection, that apply to **claim 1** also apply to **claim 7**.

13. With respect to **Claim 8**, which is the corresponding method claim of apparatus **claim 1**, **Watkins et al.**, teaches and suggests "A method of maintaining a static magnetic field generated by a static magnetic field generating unit uniform in a magnetic resonance imaging apparatus, by generating an additional magnetic field, the method comprising the steps of: calculating a temperature dependence of an ununiform component of a space distribution of the static magnetic field." [See col. 2 line 36 through col. 6 line 51] **Watkins et al.**, also teaches and suggests "detecting a temperature of the static magnetic field generating unit;" [See col. 5 line 24 through col. 6 line 14] "and calculating a strength of the additional magnetic field" [See col. 5 lines 46-53] The same reasons for rejection, that apply to **claim 1** also apply to **claim 8**.

14. With respect to **Claim 6**, and corresponding **claim 12** which depends from **claim 8**, **Watkins et al.**, suggests and shows that "the magnetic field correcting unit generates at least one

additional magnetic field of linear term of y, quadratic term of z and quartic term of z, where z is the direction of the static magnetic field and y is one direction orthogonal to z." [See Figures 1 through 4, and especially Figure 2, where the direction of component 168, the static magnetic field is interpreted by the examiner as the z direction, as is conventional within the MRI, NMR art. The imaging volume 170 in figure 2 is in the same plane as correction coils 166 and is orthogonal to static magnetic field 168, therefore correction coils 166, suggestively generate an additional magnetic field, and the examiner in interpreting the direction of the correction field as the y direction.] The examiner also notes that within the MRI / NMR art the direction of the static magnetic field is conventionally designated to be z, while the two remaining orthogonal directions are conventionally designated x and y; with x being the primary orthogonal plane in horizontal configurations, and y the primary orthogonal plane in vertical magnet, or open magnet situations. Given the orientation of the magnet in Figure 2, the interpretation that the direction of the magnetic field produced by correction coils 166, as "y" is conventional, inherent, and proper. The same reasons for rejection, that apply to **claims 1, 8** also apply to **claims 6, 12**.

15. With respect to **Claim 9**, **Watkins et al.**, suggests that "steps from the temperature detection to the generation of the additional magnetic field are conducted at all times", because **Watkins et al.**, teaches that "the sum of the compensating flux and the polarizing magnetic flux remains substantially constant as variations occur in a magnet temperature." [See col. 7 lines 5-8, Figures 1, 4, and the entire reference in general]. The same reasons for rejection, that apply to **claims 1** and **8** also apply to **claim 9**.

16. With respect to **Claim 10**, **Watkins et al.**, suggests that the "steps from the temperature detection to the generation of the additional magnetic field are conducted at predetermined time intervals." [See col. 5 line 18 through col. 6 line 14; col. 4 lines 1-18; col. 2 lines 36-53, the abstract, and the entire reference in general.] The same reasons for rejection, that apply to **claim 8** also apply to **claim 10**.

17. With respect to **Claim 11**, **Watkins et al.**, teaches and suggests "measuring NMR signals generated from an object to be examined; [See col. 5 lines 24 through col. 6 line 14] "calculating a magnetic field error component attributable to the object using the measured NMR signals" [See col. 5 lines 24 through col. 6 line 14]; and "calculating a strength of the additional magnetic field based on the error component attributable to the object" [See col. 5 lines 24 through col. 6 line 14, especially col. 5 line 64 through col. 6 line 14]; **Watkins et al.**, teaches and suggests "generating an additional magnetic field having an intensity equal to that of the sum of that obtained based on the detected temperature and the temperature dependence and that calculated based on the error component." [See col. 4 line 1 through col. 6 line 51, col. 2 lines 36-53, Figures 1 through 4] The same reasons for rejection, that apply to **claims 1,** and **8** also apply to **claim 11**.

18. With respect to **Claim 13**, **Watkins et al.**, teaches, shows and suggests "A magnetic resonance imaging apparatus comprising: a static magnetic field generating means that generates a static magnetic field of a constant magnetic field intensity" [See Figure 1 main magnet 140], and a uniformity correcting means (i.e. temperature compensation system 180 with correction coil system 166 shown in Figures 1 through 4,) "that detects a temperature change affecting the

uniformity of the magnetic field generated by the static magnetic field generating means" [See col. 4 line 1 through col. 6 line 51, col. 2 lines 36-53, Figures 1 through 4] **Watkins et al.**, also teaches generating a magnetic field for canceling a change of the magnetic field intensity due to a temperature change based on the detected temperature change." [See col. 4 line 1 through col. 6 line 51, col. 2 lines 36-53, Figures 1 through 4, the abstract and the entire reference in general.] The same reasons for rejection, that apply to **claims 1, and 8,** also apply to **claim 13**.

Claim Rejections - 35 USC § 103

19. The rejection of **Claims 1-13** under **35 U.S.C. 103(a)** as being unpatentable over **Ishihara et al.**, US patent 5,378,987 issued January third 1995; filed March 11th 1993 are **rescinded** in view of applicant's arguments in the March 4th 2002 response.

20. **Prior Art** of **Record**

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

A) **Ishihara et al.**, US patent 6,194,899 B1 issued February 27th 2001; filed February 17th 1999.

B) **Ishihara et al.**, US patent 5,378,987 issued January third 1995; filed March 11th 1993;

Conclusion

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is (703) 305-0430. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

23. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz, can be reached on (703) 305-4816. The fax phone number for the organization where this application or proceeding is assigned is (703)305-3432 .

24. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0956.

Tiffany A. Fegan

TAF

April 15, 2002

EDWARD LEFKOWITZ
PRIMARY EXAMINER